WM-AF67/BF67

SERVICE MANUAL

US Model
Canadian Model
WM-AF67

AEP Model
UK Model
E Model
WM-BF67

This photo is BF-67.

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Model Name Using Similar Mechanism	New
Tape Transport Mechanism Type	WMF-67-80

SPECIFICATIONS

Radio section

Frequency range
- FM: 87.6–107MHz(West Germany model)
  87.6–108MHz(EXCEPT FOR West Germany model)
- AM: 531–1,602kHz(West Germany model)
  530–1,605kHz(EXCEPT FOR West Germany model)

Antenna
- FM: Headphone cord antenna or earphone cord antenna
- AM: Built-in ferrite bar antenna

Recording section

Recording system
- 4-track 2-channel stereo

Input
- Microphone input jack (stereo minijack) (PLUG IN POWER)
  sensitivity 0.26 mV for low inpedance microphone

Tape player section

Frequency response (Dolby NR off)
- 30 — 15,000 Hz

Power output
- 5 mW + 5 mW load impedance 16 ohms at DC operation

Power requirements
- 3 V DC
  Two R6 (size AA) batteries
- DC IN 3 V jack accepts:
  - Optional Sony EBP-500B battery case for use with two R20 (size D) batteries
  - Optional Sony AC-D2L AC power adaptor
    for use on 120V AC, 60Hz (US, Canadian model)
    for use on 240V AC, 50Hz (UK model)
    for use on 220V AC, 50Hz (AEP, West Germany model)
    for use on 120V AC, 60Hz or 220V AC, 50Hz (E model)
  - Optional Sony DCC-70 car battery cord for use with 12 V car battery

Battery life (Dolby NR off)

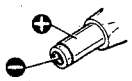
	Sony alkaline battery AM 3 (N)
Playback	Approx. 6 hours
FM reception	Approx. 23 hours
Recording	Approx. 5.5 hours

Dimensions
- Approx. 115.9 × 93.2 × 39.3 mm (w/h/d)
  (4⅝ × 3¾ × 1⁹⁄₁₆ inches)
  incl. projecting parts and controls

Weight
- Approx. 280 g (9.9 oz) incl. batteries

Accessories supplied
- Belt clip (1)
- Microphone (1)
- Microphone stand (1)
- For WM-AF67
  Stereo headphones (open-air type, 1)
- For WM-BF67
  UK, E model: Stereo headphones (open-air type, 1)
  AEP, West Germany model: Stereo earphones (open-air type, 1)

Note: If an AC power adaptor or a car battery cord not manufactured by Sony is used, a fuse must be installed in the AC power adaptor or the car battery cord and the polarity of the plug must be as illustrated.



MICROFILM

RADIO CASSETTE-CORDER

SONY®

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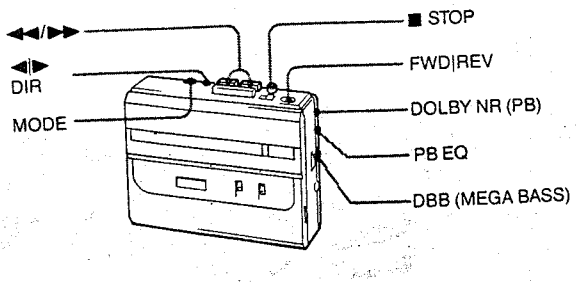
Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270℃ during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

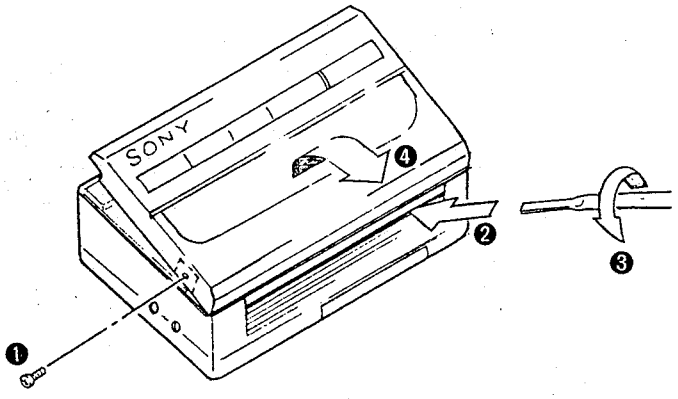
PARTS IDENTIFICATION



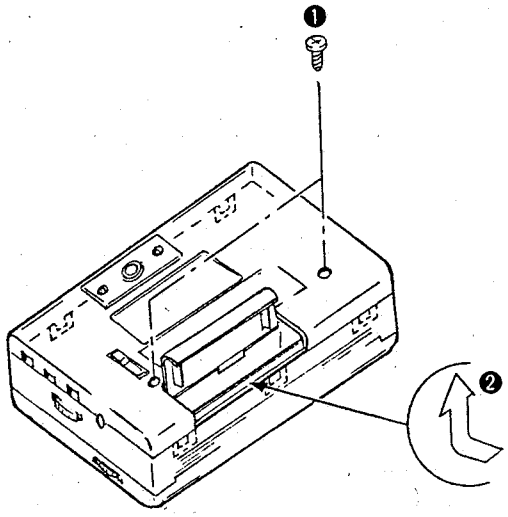
SECTION 1
DISASSEMBLY

Note: Follow the disassembly procedure the numerical order given.

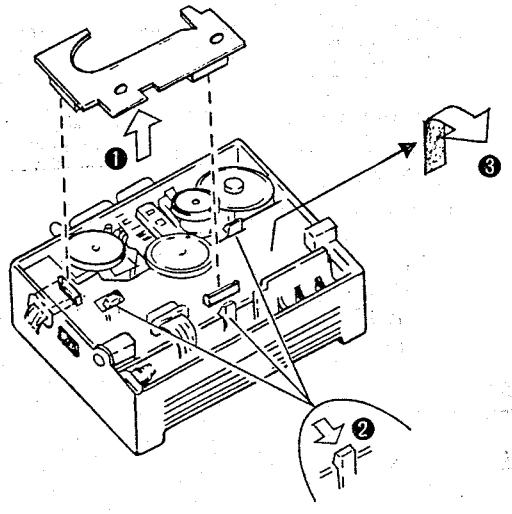
1-1. CASSETTE HOLDER



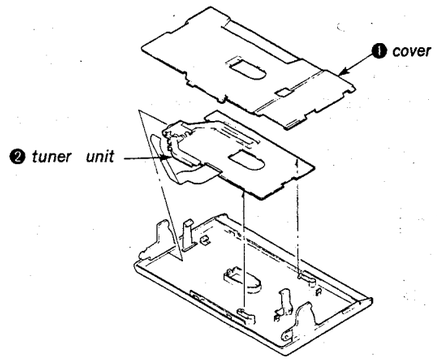
1-2. REAR CABINET



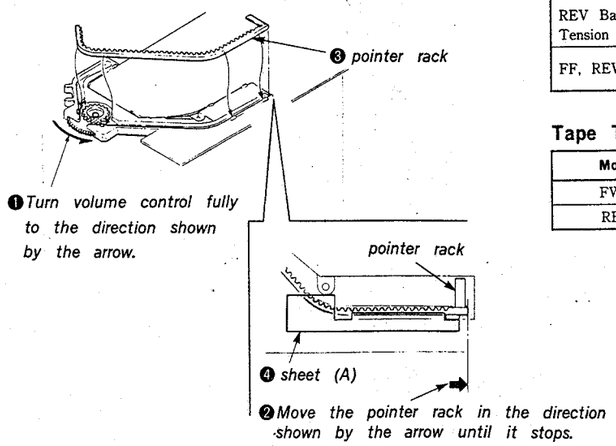
1-3. MECHANISM DECK



1-4. TUNER UNIT



1-5. POINTER RACK SETTING


❸ pointer rack
❶Turn volume control fully to the direction shown by the arrow.
pointer rack
❹ sheet (A)
❷Move the pointer rack in the direction shown by the arrow until it stops.

SECTION 2
MECHANICAL MEASUREMENTS

PRECAUTION

1. Clean the following parts with a denatured alcohol-moistened swab:
   playback head, pinch roller, capstan, rubber belts
2. Demagnetize the playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage (2.5V) unless otherwise noted.

Torque Measurement

Mode	Torque Meter	Meter Reading
FWD	CQ-102C	25—55g•cm (0.30—0.76oz•inch)
FWD Back Tension		less than 3 g•cm (less than 0.04oz•inch)
REV	CQ-102RB	22—55 g•cm (0.30—0.76oz•inch)
REV Back Tension		less than 3 g•cm (less than 0.04oz•inch)
FF, REW	CQ-201B	more than 60g • cm (more than 0.83oz•inch)

Tape Tension Measurement

Mode	Torque meter	Meter reading
FWD	CQ-403A	more than 55 g•cm (more than 0.76oz•inch)
REV	CQ-403R	

SECTION 3
ELECTRICAL ADJUSTMENTS

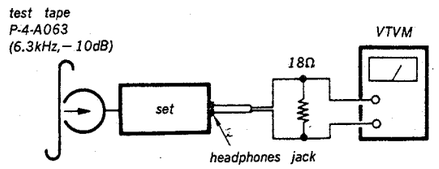
3-1. CASSETTE SECTION

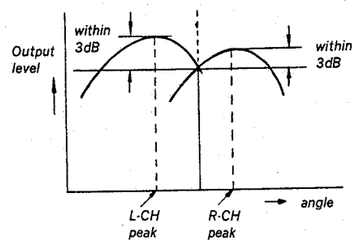
Playback Head Azimuth Check
• perform this check both in FWD and REV mode.

Note: This set is not featured the head azimuth adjustment. When repacing the head, check the both L-ch and R-ch output levels and also those phases.

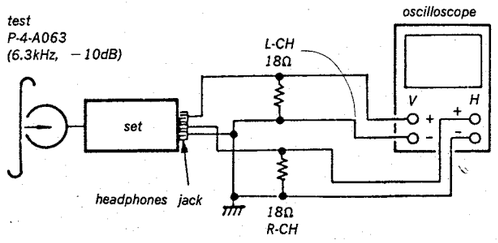
Procedure:

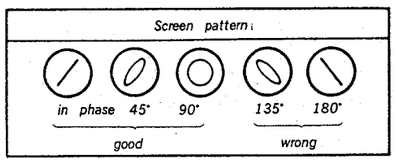
1. Level Check
   Mode : playback





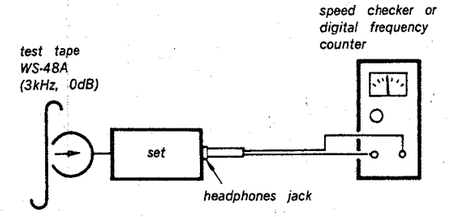
2. Phase Check
   Mode : playback





Tape Speed Adjustment

Procedure:
Mode: playback

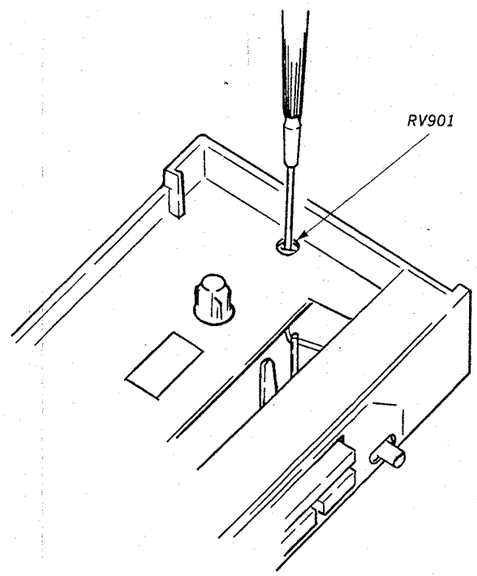


Specification:

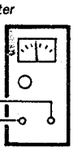
Speed checker	Digital frequency counter
±1%	2,970—3,030Hz

Frequency difference between the beginning and the end of the tape should be within±2.5% (±75%Hz).

Adjustment Location: RV901

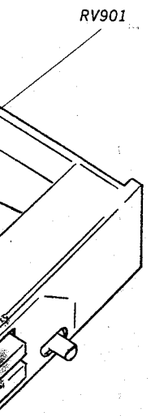


d checker or
of frequency
ter



counter
Hz

; and the end of
).



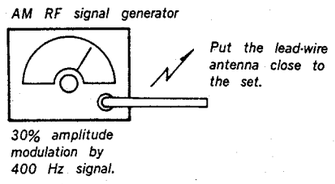
3-2. RADIEO SECTION

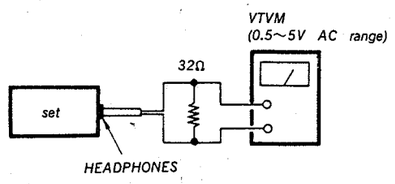
Note : DC Supply Voltage 2.5V

AM

Setting

Function: RADIO
BAND: AM





AM TRACKING ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T6	620kHz
CT2	1,400kHz

AM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T3	525kHz (526.5kHz)
CT3	1,650kHz (1606.5kHz)

( ) : BF 67 WG Model

AM IF ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T4	455kHz (468kHz)

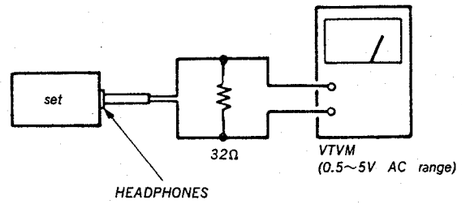
( ) : BF 67 UK Model

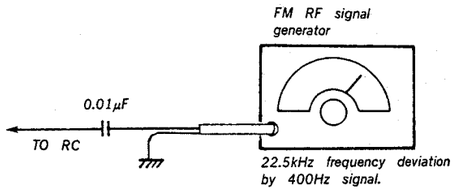
- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capactiors.
- WG : West Germany madel

FM

Setting:

FUNCTION : RADIO
BAND FM (DX): WM-AF67
FM (ST): WM-BF67





- Repeat the procedures in each adjustment several times, and the adjustments should be finally done by the trimmer capactiors.

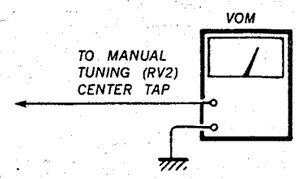
* FM frequency coverage adjustment should be done after frequency control voltage adjustment.

FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T2	85MHz (87.35MHz)
CT1	110.5MHz (107.8MHz)

( ) : BF 67 WG Model

FREQUENCY CONTROL VOLTAGE ADJUSTMENT

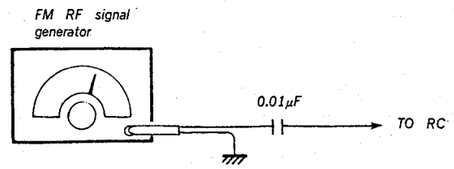
* This adjustment should be done before FM frequency coverage adjustment.

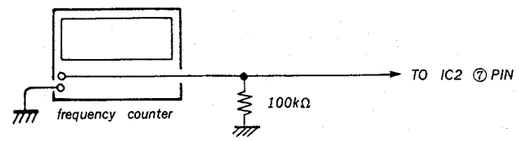


to be adjusted	RV3(PRESET / RV101)	RV1
readings	1V±0.1V	9V±0.1V
tuning dial	f min	f max

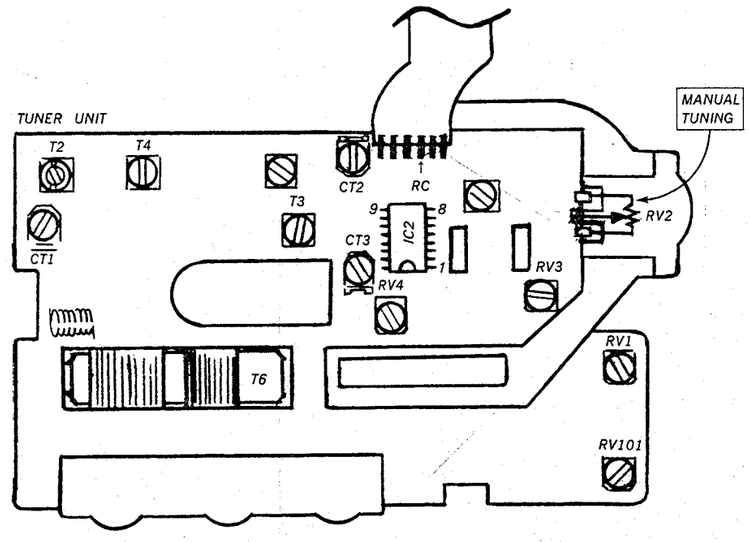
VCO Adjustment

procedure: Carrier frequency: 98MHz
Modulation: 1kHz deviation (30%)





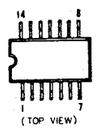
1. Tune the set to 98MHz.
2. Adjust RV4 for 38kHz±200Hz on the counter.



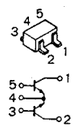
SECTION 4
DIAGRAMS

● SEMICONDUCTOR LEAD LAYOUTS

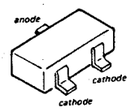
CXA1249M



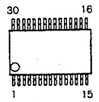
XN1215
XN1501



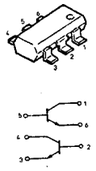
1S2835



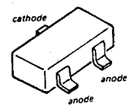
CX20023



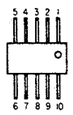
XN4501



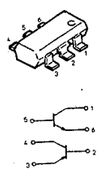
1S2837



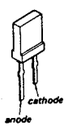
LA4533M



XN4601

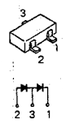


SLB-24VR3



NJM2063AM

1SS123



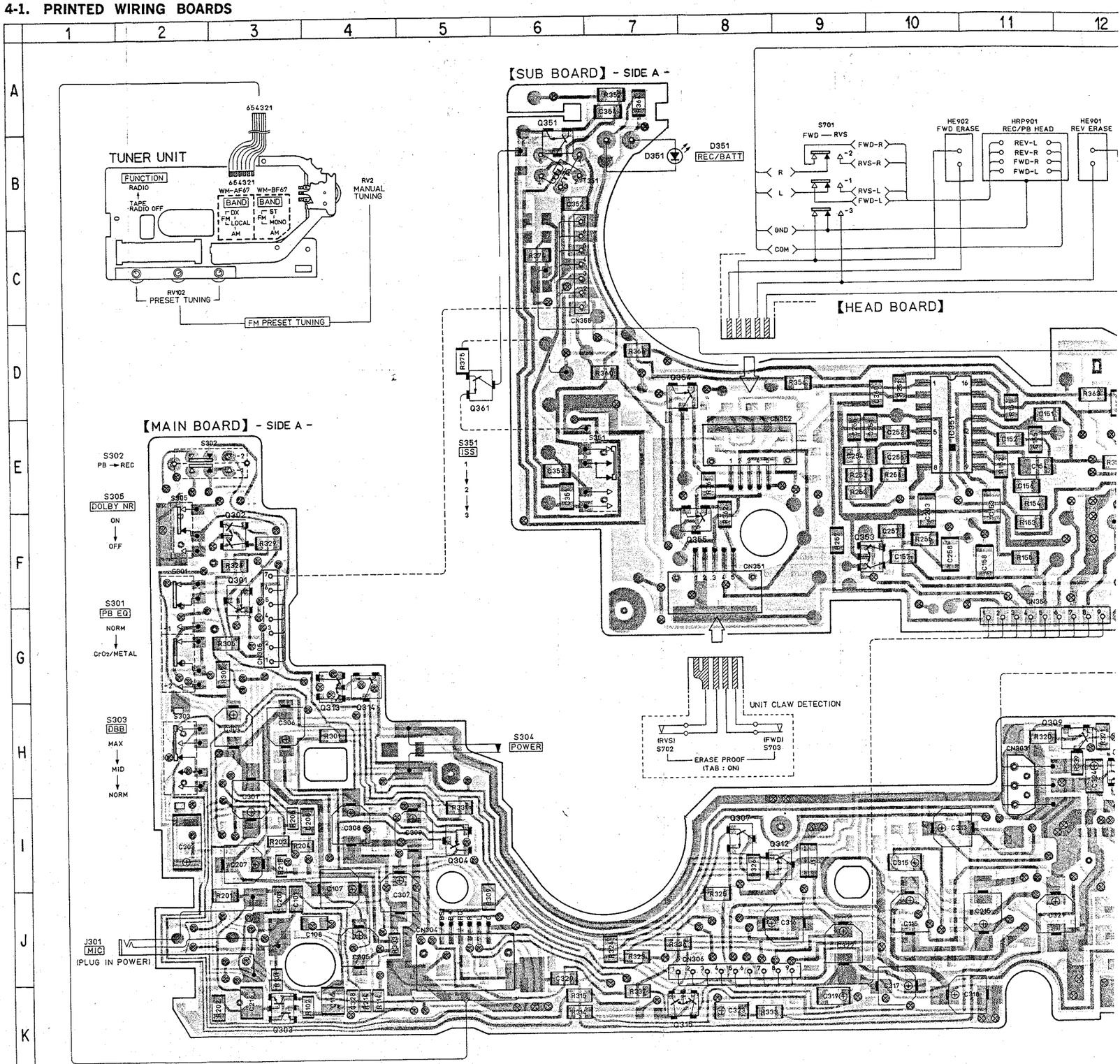
DTC114YK
2SA1162
2SB1295-UL6
2SC2712
2SD596

● Semiconductor Location

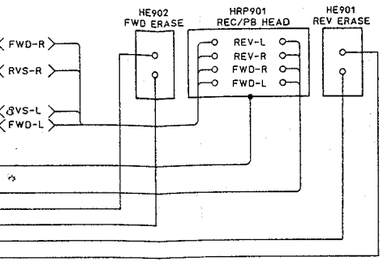
Ref. No.	Location
D301	I-15
D302	F-25
D303	I-23
D304	I-23
D305	K-24
D351	B-7
D352	F-20
IC301	I-24
IC302	J-18
IC303	J-19
IC351	E-10
Q301	F-3
Q302	F-3
Q303	K-3
Q304	I-5
Q305	I-24
Q306	J-20
Q307	I-8
Q308	H-12
Q309	H-12
Q310	H-16
Q311	J-24
Q312	I-8
Q313	G-4
Q314	G-4
Q315	K-7
Q351	B-6
Q352	F-18
Q353	F-9
Q354	D-7
Q355	F-8
Q356	D-19
Q357	E-20
Q358	D-20
Q359	F-12
Q360	F-18
Q361	D-5

- ○—— : parts extracted from the component side.
- ●—— : parts extracted from the conductor side.
- ■ : parts mounted on the conductor side.
- ⊗ : Through hole.
- ▒▒ : Pattern on the side which is seen.
- ▒▒ : Pattern of the rear side.

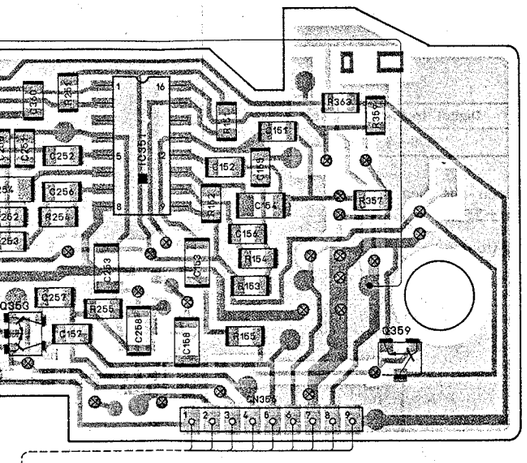
4-1. PRINTED WIRING BOARDS

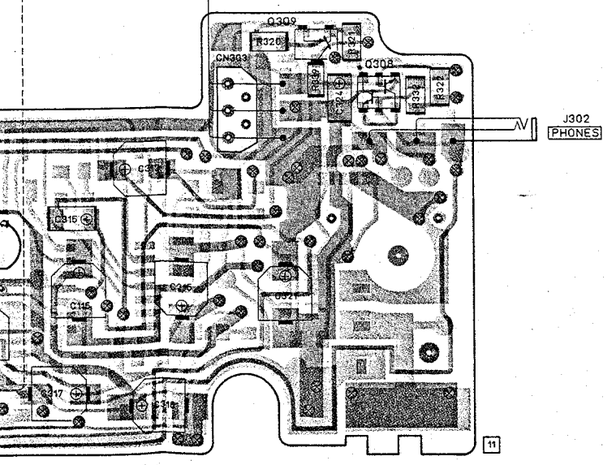


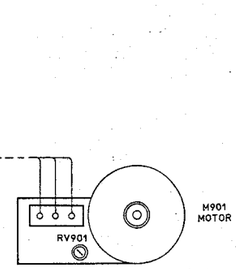
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



EAD BOARD】

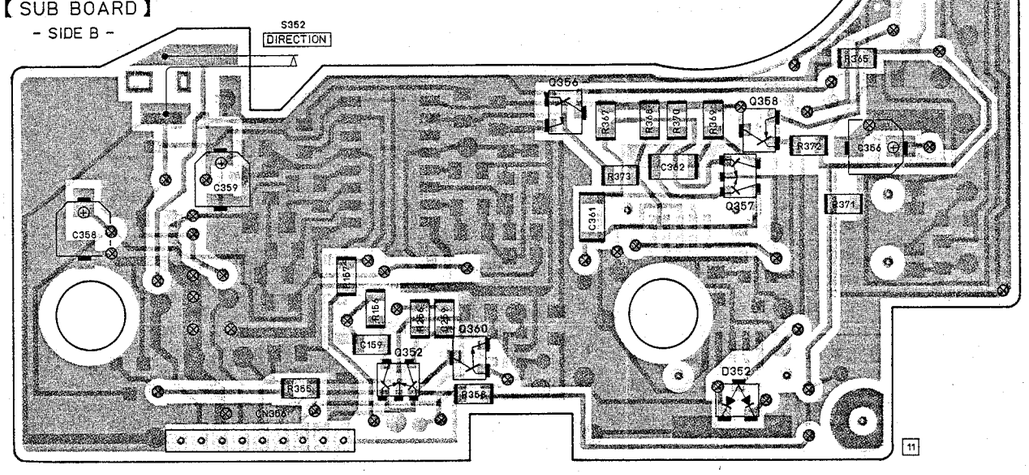


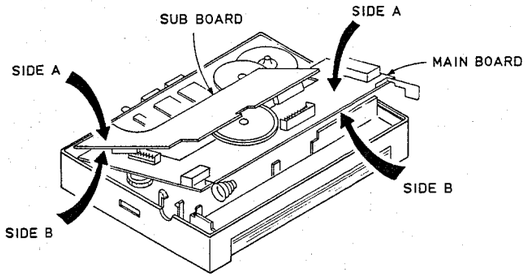


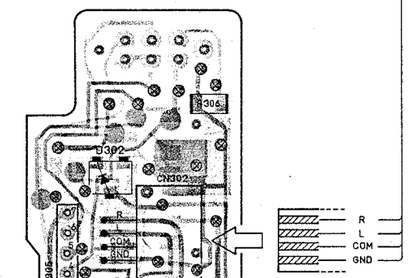


【SUB BOARD】

- SIDE B -

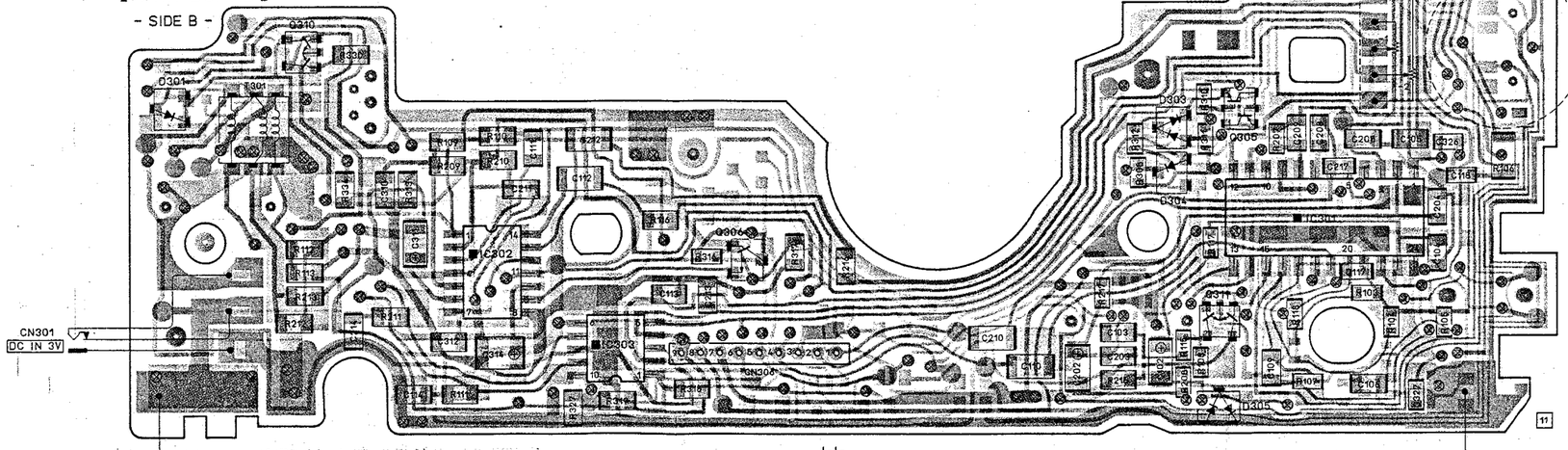




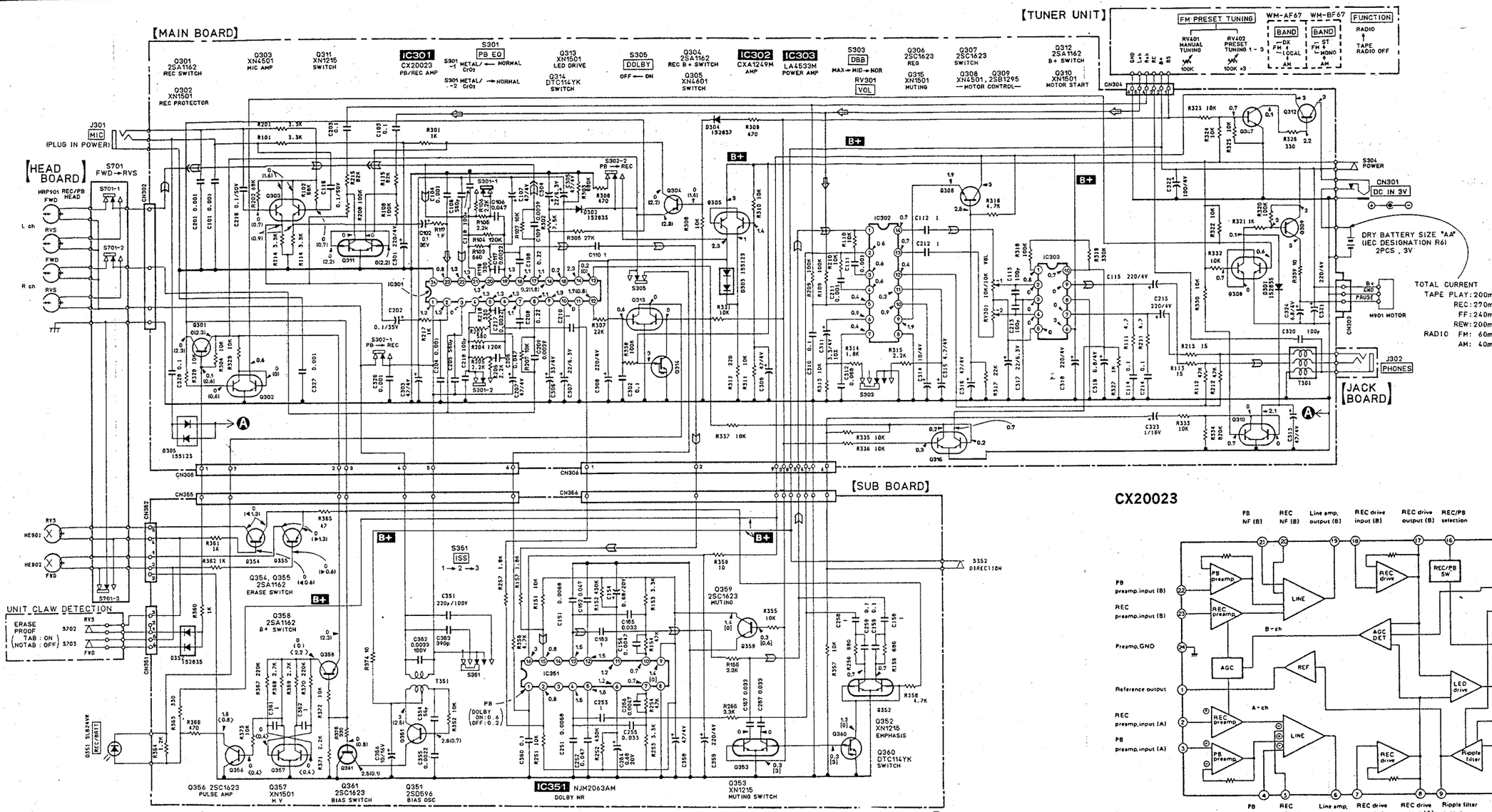


【MAIN BOARD】

- SIDE B -



4-2. SCHEMATIC DIAGRAMS —TAPE RECORDER SECTION—

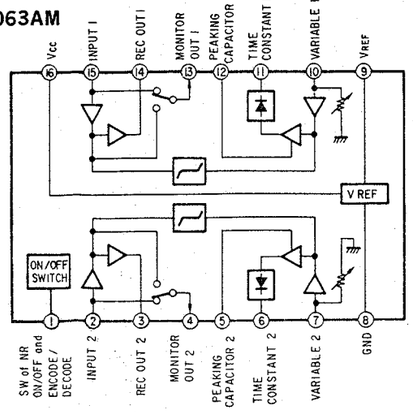


- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/10W or less unless otherwise specified.
- Switch

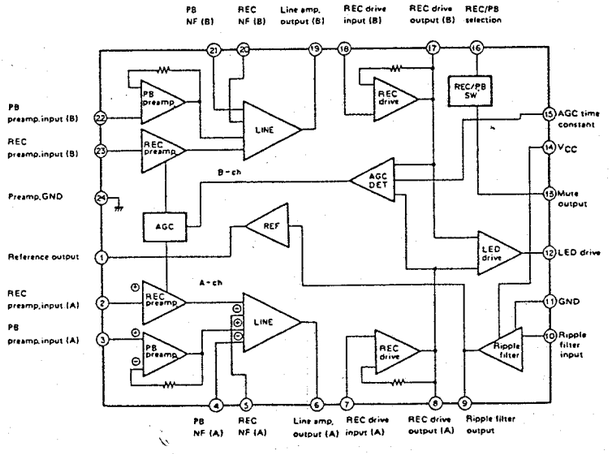
Ref. No.	Switch	Position
S301	PB. EQ	NORMAL
S302	REC/PB	PB
S303	DBB	MAX
S304	POWER	OFF
S305	DOLBY	ON
S351	ISS	1
S352	DIRECTION	OFF
S701	FWD/REV	FWD

- B+ : B+ Line
- ▭ : adjustment for repair.
- Total current is measured with no cassette installed.
- Power voltage is dc 3V and fed with regulated dc power supply from external power voltage jack.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : PB
  ( ) : REC
  < > : ERASE PROOF (TAB OFF)
- Voltages are taken with a VOM (50 kΩ/V).
  Voltage variations may be noted due to normal production tolerances.
- Signal path.
  ⇨ : FM
  ⇒ : PB
  ⇒ : REC

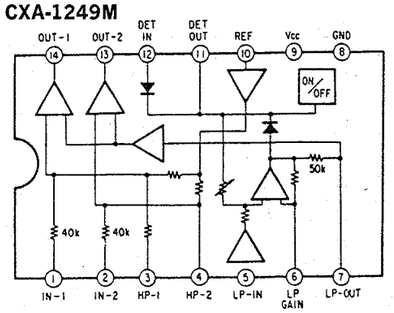
NJM2063AM



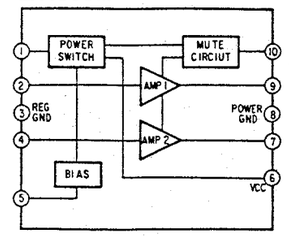
CX20023



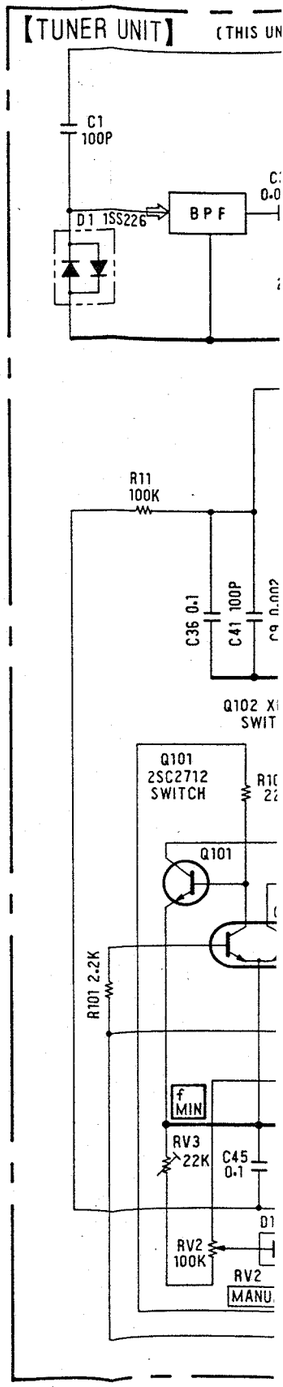
CXA-1249M



LA4533M



4-3. SCHEMATIC DIAGR



4-3. SCHEMATIC DIAGRAM —TUNER UNIT—

【TUNER UNIT】 (THIS UNIT IS SUPPLIED AS THE ASSEMBLED BLOCK)

C1 100P
D1 1SS226
BPF
C35 0.0022
R8 270
Q1 2SC2714 FM RF
L3
R3 150
C43 0.001
R1 5.6K
C2 0.002
D2 SVC212
R4 470K
C3 0.0022
C5 4P
C4 10P
R5 470K
Q2 2SC2714 FM MIX
R6 150K
Q2
R7 330
C48 0.001
C7 0.047
R9 100K
Q3
Q3 2SC2712 FM IF AMP
R10 330
C8 0.047
CF1
L2 27μH
C39 0.047
C40 0.047
T4 AM IFT
CF2
R18 8.2K
C15 33P
T5
C16 0.047
Q9, Q10 2SA1162 SWITCH
Q9
D7 MA704
Q10
WM-AF67
R21 2.2K
R20 2.2K
S2 BAND
WM-AF64 AM → LOCAL → FM DX
WM-BF64 AM → FM MONO → FM ST
S2
WM-AF67
WM-AF67
C17 0.001
IC1 TA7787F FM IF/DET AM OSC,IF/DET
IC1
R12 330
R13 120K
R14 470K
C11 1P
R24 470K
Q4 2SC2714 FM OSC
Q4
R11 100K
C10 6P
D3 SVC212
D4 SV341
C23 0.047
T6
T2
CT1
FM OSC
CT2
CT3
T3
AM OSC
AM FERRITE-ROD ANTENNA
C20 430P
C21 22P
C38 0.047
R22 10K
C19 0.047
C18 0.047
C51 10 4V
R15 33
C36 0.1
C41 100P
C9 0.002
C12 8P
C13 0.22
R16 39K
R17 470K
R25 470K
C24 4P
C22 0.047
R23 470K
Q8
Q7 XN1501
Q8 2SA1162
POWER SWITCH
R28 56K
C52 10 4V
Q7
R27 330
R26 2.2K
R29 22K
C37 0.1
C44 0.047
L1 27μH
Q102 XN1501 SWITCH
Q103 XN1401 SWITCH
Q101 2SC2712 SWITCH
R108 22K
R104 470K
R105 1M
f MAX
RV1 22K
R106 1M
Q103
Q101
R103 470
Q102
R102 2.2K
R101 2.2K
S3 FM PRESET TUNING
-PRESET-
MANUAL → 1 → 2 → 3
S3
RV102 100K
-1
-2
-3
WM-AF67
f MIN
RV101 PRESET f ADJ
WM-AF67
D102
WM-AF67
RV3 22K
C45 0.1
R107 470K
D101
RV2 100K
RV2
MANUAL TUNING
D101,102 1SS184
D5 1SS184
T7
R33 6.8K
C31 0.0027
R36 10
C56 4.7 10V
C33 0.22
D6
C34 0.047
R34 3.3K
C32 47P
Q6
Q5
Q5 2SC2712
Q6 2SC3265
DC-DC CONVERTER
R31 12K
C26 0.1
C25 0.047
VCO
RV4 10K
R32 22K
C27 470P
IC2 TA7370F FM MPX AM AMP
IC2
R30 39
C28 0.047
C54 3.3 4V
C29 0.001
C30 0.001
D8 1SS226
C55 10 4V
R19 47
S1 FUNCTION TAPE/RADIO OFF → RADIO
S1
L
R
L-CH
R-CH
GND
B S
R C (ANTENNA)
B+
A TO MAIN BOARD

• Switch

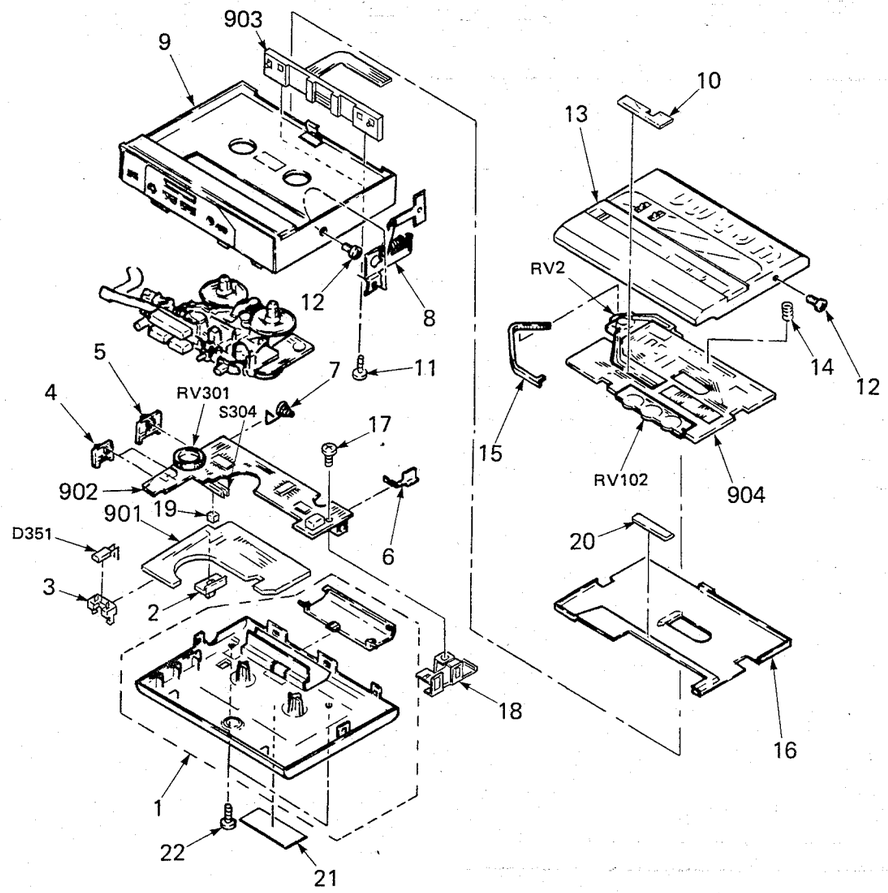
Ref. No.	Switch	Position
S1	FUNCTION	TAPE
S2	BAND	AM
S3	FM PRESET TUNING	MANUAL

SECTION 5
EXPLODED VIEWS

NOTE:

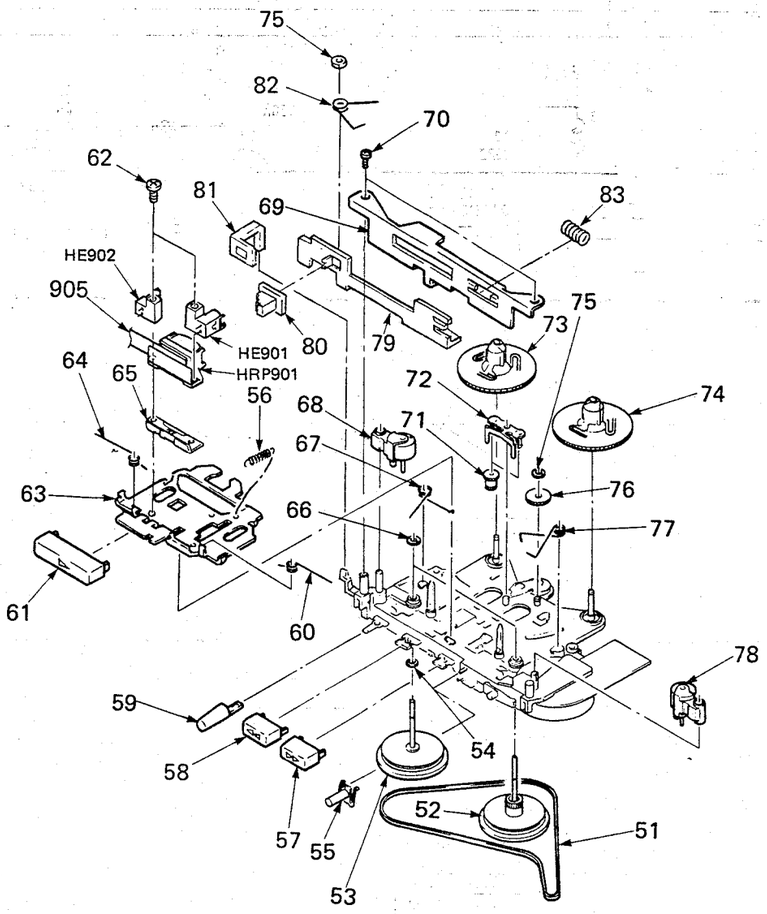
- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) ...KNOB, BALANCE (WHITE)
  ↑ ↑
  Cabinet's Color Parts' Color

5-1. CABINET, CASSETTE HOLDER SECTION



Ref.No	Part No.	Description	Remarks
1	X-3336-710-1	CABINET (REAR) ASSY	
2	3-347-874-01	KNOB (ISS)	
3	*3-347-878-01	HOLDER, LED	
4	3-346-725-01	KNOB (DOLBY NR) (PB EQ)	
5	3-346-726-01	KNOB (DBB)	
6	3-341-954-01	TERMINAL BOARD, BATTERY	
7	3-341-953-01	SPRING	
8	X-3346-546-1	BRACKET ASSY	
9	X-3336-707-1	(BF67)....CABINET (FRONT) ASSY	
9	X-3336-712-1	(AF67)....CABINET (FRONT) ASSY	
10	*3-346-798-01	SHEET (POINTER)	
11	3-318-382-21	SCREW (1.7X3), TAPPING	
12	3-704-197-31	SCREW (M1.4X3.0), LOCKING	
13	X-3336-708-1	(BF67 ; WG)....HOLDER ASSY, CASSETTE	
13	X-3336-709-1	(BF67 ; UK, E, IT)....HOLDER ASSY, CASSETTE	
13	X-3336-711-1	(AF67)....HOLDER ASSY, CASSETTE	
14	3-346-799-01	SPRING, COMPRESSION	
15	3-336-708-01	RACK, POINTER	
16	*3-346-737-01	COVER	
17	3-704-197-01	SCREW (M1.4X2), TOOTHED LOCK	
18	*3-347-877-01	REINFORCEMENT	
19	*3-341-947-01	RUBBER, LEAF SW	
20	9-911-863-XX	SPACER (G)	
21	*3-347-873-01	(BF67 ; WG)....LABEL, MODEL NUMBER	
22	3-318-203-81	SCREW (B1.7X7), TAPPING	
901	A-3216-654-A	MOUNTED PCB, SUB	
902	A-3216-655-A	MOUNTED PCB, MAIN	
903	1-466-056-11	UNIT, CLAW DETECTION	
904	1-465-012-11	(AF67)....TUNER UNIT (WITH PRESET)	
904	1-465-012-21	(BF67 ; WG)....TUNER UNIT (WITH PRESET)	
904	1-465-012-31	(BF67 ; AEP)....TUNER UNIT (WITH PRESET)	
904	1-465-012-41	(BF67 ; UK)....TUNER UNIT (WITH PRESET)	

5-2. MECHANISM (1)

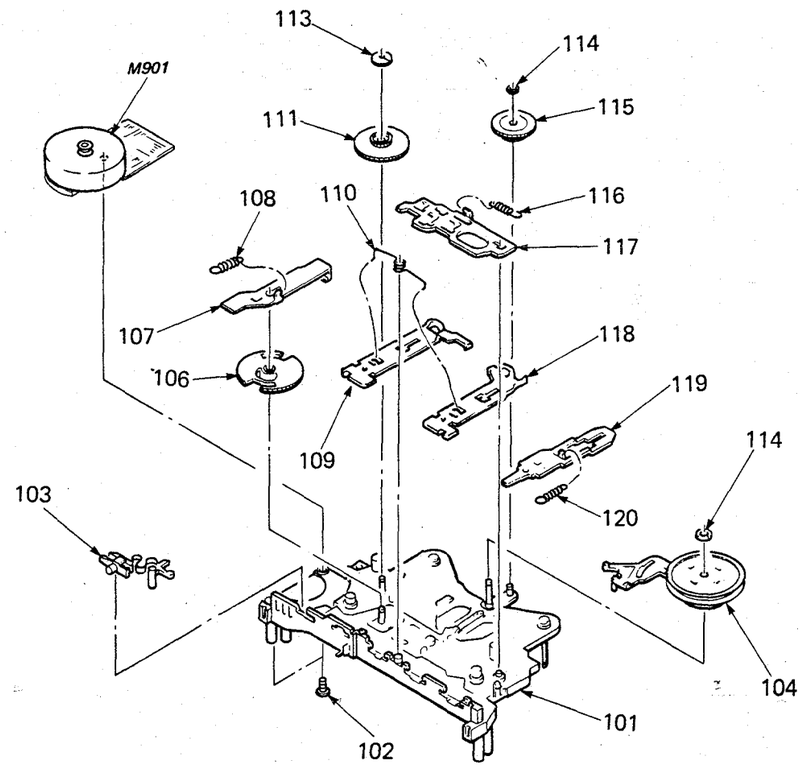


Ref.No	Part No.	Description	Remarks
51	3-341-267-01	BELT, CAPSTAN	
52	X-3335-635-1	FLYWHEEL (T) ASSY	
53	X-3335-636-1	FLYWHEEL ASSY	
54	3-701-437-11	WASHER (242T),TEFLON	
55	3-341-294-01	BUTTON, DIR	
56	3-341-271-01	SPRING, TENSION	
57	3-346-587-01	BUTTON (FF)	
58	3-346-588-01	BUTTON (REW)	
59	3-341-961-01	BUTTON (STOP)	
60	3-341-276-21	SPRING (N)	
61	3-346-586-01	BUTTON (PLAY)	
62	3-347-868-01	SCREW (M1.4), SPECIAL HEAD PAN	
63	3-341-711-01	LEVER, PLAY	
64	3-341-277-21	SPRING (R)	
65	*3-347-869-01	BASE, HEAD	
66	3-321-483-11	RING, RETAINING	
67	3-341-270-01	SPRING (R)	
68	X-3335-694-2	PINCH LEVER (R) ASSY	
69	*3-347-859-01	HOLDER (R)	
70	3-893-942-61	SCREW (1.7X3), TAPPING (B)	
71	3-341-275-01	GEAR, FR	
72	3-341-701-01	LEVER, FR	
73	3-341-291-01	GEAR, S REEL	
74	3-341-290-01	GEAR, T REEL	
75	3-341-752-11	WASHER, POLYETHYLENE (t=0.25)	
76	3-341-265-01	GEAR, R	
77	3-341-763-01	SPRING	
78	X-3335-693-1	PINCH LEVER (N) ASSY	
79	X-3336-705-1	SLIDER (R) ASSY	
80	3-347-870-01	KNOB (REC)	
81	3-347-871-01	PLATE (DIR), INDICATION	
82	3-347-867-01	SPRING (R LOCK), TORSION	
83	3-347-866-01	SPRING, COMPRESSION	
905	1-628-471-11	PC BOARD, HEAD	
HE901	1-543-582-11	HEAD, MAGNETIC (ERASE)	
HE902	1-543-582-11	HEAD, MAGNETIC (ERASE)	
HRP901	1-543-583-11	HEAD, MAGNETIC (REC/PB)	

5-3. MECHANISM (

Ref.No	Part No.	D
101	A-3163-159-A	CHA
102	3-345-648-01	SCR
103	3-341-293-01	LEVI
104	A-3239-894-A	WHE
106	3-341-292-01	GEA
107	3-341-299-11	LEVI
108	3-341-274-01	SPR
109	3-341-295-01	LEVI
110	3-341-268-01	SPR
111	3-341-289-01	GEA

5-3. MECHANISM (2)



Ref.No	Part No.	Description	Remarks
101	A-3163-159-A	CHASSIS ASSY	
102	3-345-648-01	SCREW (M1.4X3.0), TOOTHED LOCK	
103	3-341-293-01	LEVER, MODE	
104	A-3239-894-A	WHEEL ASSY, MIDWAY	
106	3-341-292-01	GEAR, CAM	
107	3-341-299-11	LEVER, DIR	
108	3-341-274-01	SPRING (POWER TENSION),TENSION	
109	3-341-295-01	LEVER, FF	
110	3-341-268-01	SPRING	
111	3-341-289-01	GEAR, DECELERATION	
113	3-341-752-11	WASHER, POLYETHYLENE (t=0.25)	
114	3-341-753-11	WASHER, POLYETHYLENE (t=0.25)	
115	3-341-266-01	GEAR, T	
116	3-341-272-01	SPRING, TENSION	
117	3-341-298-01	PLATE, LOCK	
118	3-341-296-01	LEVER, REW	
119	3-341-297-01	LEVER, STOP	
120	3-341-273-01	SPRING, TENSION	
M901	8-835-339-01	MOTOR, DC U-24A	

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

Ref.No	Part No.	Description			
901	A-3216-654-A	MOUNTED PCB, SUB			
902	A-3216-655-A	MOUNTED PCB, MAIN			
903	1-466-056-11	UNIT, CLAW DETECTION			
904	1-465-012-11	(AF67)....TUNER UNIT (WITH PRESET)			
904	1-465-012-21	(BF67 ; WG)....TUNER UNIT (WITH PRESET)			
904	1-465-012-31	(BF67 ; AEP)....TUNER UNIT (WITH PRESET)			
904	1-465-012-41	(BF67 ; UK)....TUNER UNIT (WITH PRESET)			
905	1-628-471-11	PC BOARD HEAD			
		CAPACITOR			
C101	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C102	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V
C103	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C104	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C105	1-163-135-00	CERAMIC CHIP	560PF	10%	50V
C106	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V
C107	1-126-208-11	ELECT	47MF	20%	4V
C108	1-164-222-91	CERAMIC CHIP	0.22MF		25V
C109	1-163-016-00	CERAMIC CHIP	0.0039MF	10%	50V
C110	1-162-638-11	CERAMIC CHIP	1MF		16V
C111	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C112	1-162-638-11	CERAMIC CHIP	1MF		16V
C113	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C114	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C115	1-126-246-11	CAP, ELECT	220MF	20%	4V
C116	1-124-766-00	ELECT	0.1MF	20%	50V
C117	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V
C118	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C151	1-163-019-00	CERAMIC CHIP	0.0068MF		50V
C152	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V
C153	1-162-638-11	CERAMIC CHIP	1MF		16V
C154	1-135-087-21	TANTAL. CHIP	0.68MF	10%	20V
C155	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V
C156	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C157	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V
C158	1-162-638-11	CERAMIC CHIP	1MF		16V
C159	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C201	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C202	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V
C203	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C204	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C205	1-163-135-00	CERAMIC CHIP	560PF	10%	50V
C206	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V
C207	1-126-208-11	ELECT	47MF	20%	4V
C208	1-164-222-91	CERAMIC CHIP	0.22MF		25V
C209	1-163-016-00	CERAMIC CHIP	0.0039MF	10%	50V
C210	1-162-638-11	CERAMIC CHIP	1MF		16V
C211	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C212	1-162-638-11	CERAMIC CHIP	1MF		16V
C213	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C214	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C215	1-126-246-11	ELECT	220MF	20%	4V

Ref.No	Part No.	Description			
C216	1-124-766-00	ELECT	0.1MF	20%	50V
C217	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V
C218	1-162-953-11	CERAMIC CHIP	100PF	5%	50V
C251	1-163-019-00	CERAMIC CHIP	0.0068MF		50V
C252	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V
C253	1-162-638-11	CERAMIC CHIP	1MF		16V
C254	1-135-087-21	TANTAL. CHIP	0.68MF	10%	20V
C255	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V
C256	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C257	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V
C258	1-162-638-11	CERAMIC CHIP	1MF		16V
C259	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C301	1-126-246-11	ELECT	220MF	20%	4V
C302	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C303	1-135-163-81	TANTAL. CHIP	47MF	20%	4V
C304	1-124-778-00	ELECT	22MF	20%	6.3V
C305	1-126-208-11	ELECT	47MF	20%	4V
C306	1-126-207-11	ELECT	33MF	20%	4V
C307	1-124-778-00	ELECT	22MF	20%	6.3V
C308	1-126-246-11	ELECT	220MF	20%	4V
C309	1-126-208-11	ELECT	47MF	20%	4V
C310	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C311	1-135-103-00	TANTAL. CHIP	3.3MF	10%	4V
C312	1-163-833-00	CERAMIC CHIP	0.068MF		25V
C313	1-126-208-11	ELECT	47MF	20%	4V
C314	1-135-157-21	TANTAL. CHIP	10MF	20%	4V
C315	1-135-151-21	TANTAL. CHIP	4.7MF	20%	4V
C316	1-126-208-11	ELECT	47MF	20%	4V
C317	1-124-778-00	ELECT	22MF	20%	6.3V
C318	1-126-246-11	ELECT	220MF	20%	4V
C319	1-135-170-21	TANTAL. CHIP	6.8MF	20%	4V
C320	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C321	1-126-246-11	ELECT	220MF	20%	4V
C322	1-126-209-11	ELECT	100MF	20%	4V
C323	1-135-091-00	TANTAL. CHIP	1MF	20%	16V
C324	1-135-170-21	TANTAL. CHIP	6.8MF	20%	4V
C326	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C327	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C328	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C351	1-164-163-11	CERAMIC CHIP	220PF	5%	100V
C352	1-164-182-11	CERAMIC CHIP	0.0033MF	10%	100V
C353	1-163-131-00	CERAMIC CHIP	390PF	10%	50V
C354	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C355	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V
C356	1-124-779-00	ELECT	10MF	20%	16V
C358	1-126-208-11	ELECT	47MF	20%	4V
C359	1-126-246-11	ELECT	220MF	20%	4V
C360	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C361	1-162-638-11	CERAMIC CHIP	1MF		16V
C362	1-162-638-11	CERAMIC CHIP	1MF		16V
CN301	1-507-951-11	JACK, EXTERNAL POWER (DC IN 3V)			

Ref.No	Part No.	Description
CN302	1-565-663-11	HOUSING, CONNECTOR (FPC) 4P
CN303	*1-565-369-11	SOCKET, CONNECTOR 3P
CN304	1-566-682-11	HOUSING, CONNECTOR 6P
CN305	*1-568-048-11	PIN, CONNECTOR (PC BOARD) 7P
CN306	*1-568-050-11	PIN, CONNECTOR (PC BOARD) 9P
CN351	*1-565-370-11	HOUSING, CONNECTOR 5P
CN352	*1-565-370-11	HOUSING, CONNECTOR 5P
CN355	*1-568-039-11	HOUSING, CONNECTOR 7P
CN356	*1-568-041-11	HOUSING, CONNECTOR 9P
D301	8-719-100-03	DIODE 1S2835
D302	8-719-100-03	DIODE 1S2835
D303	8-719-101-23	DIODE 1SS123
D304	8-719-100-05	DIODE 1S2837
D305	8-719-101-23	DIODE 1SS123
D351	8-719-951-48	DIODE SLB-24VR3 (REC/BATT)
D352	8-719-100-03	DIODE 1S2835
HE901	1-543-582-11	HEAD, MAGNETIC (ERASE)
HE902	1-543-582-11	HEAD, MAGNETIC (ERASE)
HRP901	1-543-583-11	HEAD, MAGNETIC (REC/PB)
IC301	8-759-915-90	IC CX20023
IC302	8-759-805-09	IC CXA1249M
IC303	8-759-802-75	IC LA4533M
IC351	8-759-701-07	IC NJM2063AM
J1	1-216-296-00	METAL GLAZE 0 5% 1/8W
J301	1-566-800-31	JACK (MIC)
J302	1-562-974-11	JACK (PHONES)
M901	8-835-339-01	MOTOR, DC U-24A
Q301	8-729-216-22	TRANSISTOR 2SA1162
Q302	8-729-402-13	TRANSISTOR XN1501
Q303	8-729-402-81	TRANSISTOR XN4501
Q304	8-729-216-22	TRANSISTOR 2SA1162
Q305	8-729-402-84	TRANSISTOR XN4601
Q306	8-729-271-23	TRANSISTOR 2SC2712
Q307	8-729-271-23	TRANSISTOR 2SC2712
Q308	8-729-402-81	TRANSISTOR XN4501
Q309	8-729-807-87	TRANSISTOR 2SB1295-UL6
Q310	8-729-402-13	TRANSISTOR XN1501
Q311	8-729-403-17	TRANSISTOR XN1215
Q312	8-729-216-22	TRANSISTOR 2SA1162
Q313	8-729-402-13	TRANSISTOR XN1501
Q314	8-729-900-52	TRANSISTOR DTC114YK
Q315	8-729-402-13	TRANSISTOR XN1501
Q351	8-729-159-64	TRANSISTOR 2SD596
Q352	8-729-403-17	TRANSISTOR XN1215
Q353	8-729-403-17	TRANSISTOR XN1215
Q354	8-729-216-22	TRANSISTOR 2SA1162
Q355	8-729-216-22	TRANSISTOR 2SA1162
Q356	8-729-271-23	TRANSISTOR 2SC2712
Q357	8-729-402-13	TRANSISTOR XN1501
Q358	8-729-216-22	TRANSISTOR 2SA1162
Q359	8-729-271-23	TRANSISTOR 2SC2712
Q360	8-729-900-52	TRANSISTOR DTC114YK
Q361	8-729-216-22	TRANSISTOR 2SC2712

RESISTOR

R101	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R102	1-216-843-11	METAL GLAZE	68K	5%	1/16W
R103	1-216-818-11	METAL GLAZE	560	5%	1/16W
R104	1-216-846-11	METAL GLAZE	120K	5%	1/16W
R105	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W
R106	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R107	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R108	1-216-845-11	METAL GLAZE	100K	5%	1/16W
R109	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R110	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R111	1-216-308-00	METAL GLAZE	4.7	5%	1/10W
R112	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R113	1-216-005-00	METAL GLAZE	15	5%	1/10W
R114	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W
R115	1-216-844-11	METAL GLAZE	82K	5%	1/16W
R116	1-216-295-00	METAL GLAZE	0	5%	1/10W
R117	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R118	1-216-815-11	METAL GLAZE	330	5%	1/16W
R151	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R152	1-216-112-00	METAL GLAZE	430K	5%	1/10W
R153	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R154	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R155	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R156	1-216-045-00	METAL GLAZE	680	5%	1/10W
R157	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R201	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W
R202	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R203	1-216-818-11	METAL GLAZE	560	5%	1/16W
R204	1-216-846-11	METAL GLAZE	120K	5%	1/16W
R205	1-216-825-11	METAL GLAZE	2.2K	5%	1/16W
R206	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R207	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R208	1-216-845-11	METAL GLAZE	100K	5%	1/16W
R209	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R210	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R211	1-216-308-00	METAL GLAZE	4.7	5%	1/10W
R212	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R213	1-216-005-00	METAL GLAZE	15	5%	1/10W
R214	1-216-827-11	METAL GLAZE	3.3K	5%	1/16W
R215	1-216-095-00	METAL GLAZE	82K	5%	1/10W
R216	1-216-295-00	METAL GLAZE	0	5%	1/10W
R217	1-216-821-11	METAL GLAZE	1K	5%	1/16W
R218	1-216-815-11	METAL GLAZE	330	5%	1/16W
R251	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R252	1-216-112-00	METAL GLAZE	430K	5%	1/10W
R253	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R254	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R255	1-216-061-00	METAL GLAZE	3.3K	5%	1/10W
R256	1-216-045-00	METAL GLAZE	680	5%	1/10W
R257	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R301	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R302	1-216-070-00	METAL GLAZE	7.5K	5%	1/10W
R303	1-216-855-11	METAL GLAZE	680K	5%	1/16W
R304	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R305	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R306	1-216-041-00	METAL GLAZE	470	5%	1/10W
R307	1-216-837-11	METAL GLAZE	22K	5%	1/16W
R308	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R309	1-216-041-00	METAL GLAZE	470	5%	1/10W
R310	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R311	1-216-833-11	METAL GLAZE	10K	5%	1/16W
R312	1-216-813-11	METAL GLAZE	220	5%	1/16W
R313	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R314	1-216-055-00	METAL GLAZE	1.8K	5%	1/10W
R315	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R316	1-216-829-11	METAL GLAZE	4.7K	5%	1/16W
R317	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R318	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R319	1-216-109-00	METAL GLAZE	330K	5%	1/10W
R320	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R321	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R322	1-216-073-00	METAL GLAZE	10K	5%	1/10W

Ref.No	Part No.	Description			
R323	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R324	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R325	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R326	1-216-037-00	METAL GLAZE	330	5%	1/10W
R327	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R328	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R329	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R330	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R331	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R332	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R333	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R334	1-216-119-00	METAL GLAZE	820K	5%	1/10W
R336	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R337	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R338	1-216-845-11	METAL GLAZE	100K	5%	1/16W
R339	1-216-797-11	METAL GLAZE	10	5%	1/16W
R352	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R355	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R356	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R357	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R358	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R359	1-216-001-00	METAL GLAZE	10	5%	1/10W
R360	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R361	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R362	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R363	1-216-037-00	METAL GLAZE	330	5%	1/10W
R364	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R365	1-216-017-00	METAL GLAZE	47	5%	1/10W
R366	1-216-041-00	METAL GLAZE	470	5%	1/10W
R367	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R368	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R369	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R370	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R371	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R372	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R373	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R374	1-216-001-00	METAL GLAZE	10	5%	1/10W
R375	1-216-186-00	METAL GLAZE	330	5%	1/8W
RV2	1-230-979-11	RES, VAR, CARBON (MANUAL TUNING) 100K			
RV102	1-238-147-11	RES, VAR, CARBON 100K/100K/100K (PRESET)			
RV301	1-238-172-11	RES, VAR, CARBON 10K/10K (VOL)			
S301	1-571-277-11	SWITCH, SLIDE (PB EQ)			
S302	1-570-259-11	SWITCH, SLIDE			
S303	1-571-506-21	SWITCH, SLIDE (DBB)			
S304	1-571-149-11	SWITCH, LEAF			
S305	1-571-275-11	SWITCH, SLIDE (DOLBY)			
S351	1-571-506-21	SWITCH, SLIDE (ISS)			
S352	1-571-149-11	SWITCH, LEAF			
S701	1-571-759-11	SWITCH, SLIDE			
T301	1-409-445-11	COIL, TRAP			
T351	1-433-249-00	TRANSFORMER, BIAS OSCILLATOR			

Ref.No	Part No.	Description
		ACCESSORY & PACKING MATERIAL
	X-3346-549-1	CASE ASSY, CARRYING
	1-542-116-11	MICROPHONE
	3-341-755-01	CARDBOARD
	*3-347-883-01	(AF67 ; US)....INDIVIDUAL CARTON
	*3-347-887-01	(AF67, canadian)....INDIVIDUAL CARTON
	*3-347-888-01	(BF67)....INDIVIDUAL CARTON
	3-347-892-01	STAND, MICROPHONE
	3-701-622-00	(AF67 ; US/BF67 ; WG)....BAG, POLYETHYLENE
	3-786-677-11	(AF67 ; Canadian/BF67)....MANUAL, INSTRUCTION
	3-786-677-21	(AF67 ; US)....MANUAL, INSTRUCTION
	3-786-677-41	(BF67 ; WG, IT)....MANUAL, INSTRUCTION
	8-952-260-91	(AF67/BF67 ; UK, AEP)....HEADPHONE MDR-W10L/B SET
	8-952-350-90	(BF67 ; E)....HEADPHONE MOR-E454 SET

9-953-500-11

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Audio Group

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